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EXAMINER	
HARRIS, ANTON B	
ART UNIT	PAPER NUMBER
2831	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/057,262	CARNAHAN, DAVID L.	
	Examiner	Art Unit	
	Anton B Harris	2831	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-29 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-29 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claim 17 is objected to because of the following informalities:

Claim 17 line 1 claims dependency upon claim 18, and therefore is in an improper form.

Appropriate correction is required.

The Office interprets the claim 17 to be "The nanoscale grasping device of claim 16...".

Any further rejection of, or indications of the allowability of, either of claim 17 are based on claim 17, as it is understood by the Office.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Hung et al. (6,329,738).

Regarding claim 1, Hung et al. (col. 22, lines 25-38) discloses a nanoscale grasping device comprising at least three electrostatically actuated grasping elements 92, 94, 96, 98.

Regarding claims 28 and 29, Hung et al. (col. 22, lines 25-38) discloses at least one grasping element 92, 94, 96, 98.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hung et al. in view of Kim et al., (NANOTUBE NANOTWEEZERS, Dated 12/10/1999).

Regarding claim 2, Hung et al. discloses the invention substantially as claimed, but lacks grasping elements made of a fibrous material.

Kim et al. (page 1, paragraph 2) teaches grasping elements made of a fibrous material.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Hung et al. by providing grasping elements made of a fibrous material in order to provide remarkable mechanical toughness and electrical conductivity in view of the teachings of Kim et al.

Regarding claim 3, Kim et al. (page 1, paragraph 6) teaches that grasping elements comprise a carbon nanotube.

Regarding claim 4, Kim et al. (page 1, paragraph 6) teaches a carbon nanotube.

Furthermore, the limitation of "carbon nanotube is grown by a chemical vapor deposition (CVD) technique" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably

distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claims 5 and 6, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitations of "chemically functionalized to bind specific molecules to said grasping element" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 7, Hung et al. (col. 22, lines 25-38) discloses a nanoscale grasping device comprising at least three electrostatically actuated grasping elements 92, 94, 96, 98.

Furthermore, the limitation of "independently supplied with a voltage sufficient to induce electrostatic forces between at least two of said grasping elements, whereby to close or open said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 8, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "a steady state voltage is applied to at least one of said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 9, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "an oscillating voltage is applied to at least one of said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 10, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "an oscillating voltage is applied to at least one of said grasping elements is in phase with the oscillating voltage applied to at least one of the remaining grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 11, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "an oscillating voltage applied to at least one of said grasping elements is substantially out of phase with the oscillating voltage applied to at least one of the remaining grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 12, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "resonant vibration in said grasping elements in cancelled by oscillating voltages applied to said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 13, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "resonant vibration in said grasping elements is enhanced by oscillating voltages applied to said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 14, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "resonant vibration is thermally induced" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 15, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "resonant vibration is mechanically induced" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 16, Hung et al. (col. 22, lines 25-38) discloses three grasping elements 92, 94, 96, 98.

Furthermore, the limitation of "a steady state voltage is applied to two of said grasping elements while the remaining grasping element is left at a fixed voltage so as to induce electrostatic forces between said grasping elements, whereby to open or close said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 17, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "said fixed voltage is ground" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 18, Hung et al. (col. 22, lines 25-38) discloses three grasping elements 92, 94, 96, 98.

Furthermore, the limitation of "an oscillating voltage is applied to each of said three grasping elements, with the phases of the oscillating voltages being substantially different on all three grasping elements, thereby inducing electrostatic forces between said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 19, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "the oscillating voltage applied to each grasping element is substantially 120 degrees out of phase with its neighboring grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 20, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "grasping tool comprises four grasping elements, and further wherein a steady state voltage is applied to two neighboring grasping elements, and the remaining two grasping elements are left at another voltage" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 21, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "said another, voltage is ground voltage" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 22, Hung et al. (col. 22, lines 25-38) discloses four grasping elements 92, 94, 96, 98.

Furthermore, the limitation of "said grasping tool comprises four grasping elements, and further wherein a steady state voltage is applied to two diametrically opposite grasping elements,

and the remaining two grasping elements are left at another voltage" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 23, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "said another voltage is ground voltage" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

Regarding claim 24, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "an oscillating voltages are applied to each of said grasping elements, with each oscillating voltage being substantially 90 degrees out of phase with the other oscillating voltages" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens,* 145 USPQ 656 (CCPA 1965).

6. Claims 25-27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hung et al.

Regarding claim 25, Hung et al. (col. 22, lines 25-38) discloses where the grasping device comprises n equals 4 grasping elements 92, 94, 96, 98, but does not disclose wherein n is greater than 4.

It would have been obvious one having ordinary skill in the art at the time the invention was made to modify the device of Hung et al. by providing more than 4 grasping elements, since

it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claim 26, Hung et al. (col. 22, lines 25-38) discloses a grasping device.

Furthermore, the limitation of "steady state voltages are applied to said grasping elements so as to induce electrostatic forces between said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

Regarding claim 27, Hung et al. (col. 22, lines 25-38) discloses a grasping device.

Furthermore, the limitation of "an n phase oscillating voltage is applied to each grasping element, substantially 360/n degrees out of phase with said other grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lee et al. U.S. Patent No. 6,144,545 discloses an electrostatic device including electrodes.

Cabuz et al. U.S. Patent No. 5,822,170 discloses an electrostatic actuator including grasping elements.

Sun U.S. Patent No. 6,307,452 B1 discloses an electromechanical actuator including electrodes.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anton B Harris whose telephone number is (703) 305-4764. The examiner can normally be reached on weekdays from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Dean Reichard, can be reached on (703) 308-3682. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-1341.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.

abh

9/5/03

ANTHONY DINKINS
PRIMARY EXAMINER